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CLAIMS

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[Claim(s)]

[Claim 1] The detecting element for detecting a test subject's breathing, and the signal-processing section which takes out the information about breathing or an apnoea from the signal detected by this detecting element, While having the memory section which memorizes the information acquired in this signal-processing section, transmitting the information memorized by said memory section to the computer for data processing of another object and being made to carry out data processing The normal range of a respiration rate where the respiration rate per for 1 minute includes at least 18 - 22 times of range is appointed suitably. Normalize the case where the respiration rate suitably detected in fixed time amount from the information about said breathing is in said normal range, and the case where it deviates with said normal range is made into abnormalities. The apnoea measuring device characterized by establishing the information means for reporting that actuation of said detecting element is normal or unusual.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[Industrial Application]

This invention relates to the apnoea measuring device which can be used mainly as an object for being home.

[Description of the Prior Art]

There is an apnoea under sleep in the daytime as breathing in various diseases, such as hypersomnia, chronic insomnia, whole body malaise, and cardiac insufficiency, circulation, and a factor of the insufficient onset. If breathing stops 10 seconds or more during sleep, when it will be judged as an apnoea and this will be accepted 30 times or more in the one evening, it is called sleep apnea syndrome.

There are three types of apnoeas, a central mold apnoea, a lock out mold apnoea, and a hybrid model apnoea, at the time of this sleep. For this reason, in order to carry out confirmed diagnosis of these symptoms, it is necessary to be sent to hospital, to act as the monitor of the poly SOMUNOGURA fee all night, and to evaluate synthetically a central nervous system, respiratory hemodynamics, etc. under sleep.

[Problem(s) to be Solved by the Invention]

However, the poly SOMUNOGURA fee cannot be inspected except a specific facility with a facility, the burden to the patient by hospitalization or much inspection is also large, and it is not practical to act to all the patients that the misgiving of sleep apnea syndrome has as the monitor of the poly SOMUNOGURA fee all night.

[Means for Solving the Problem]

A detecting element for this invention to detect a test subject's breathing and the signal-processing section which takes out the information about breathing or an apnoea from the signal detected by this detecting element, While making as [ carry out / transmit and / to the computer for data processing of another object / data processing of the information which has the memory section which memorizes the information acquired in this signal-processing section, and was memorized by said memory section ] The case where the respiration rate which appointed suitably the normal range of a respiration rate where the respiration rate per for 1 minute includes at least 18 - 22 times of range, and was suitably detected in fixed time amount from the information about said breathing is in said normal range is normalized. Moreover, it is the apnoea measuring device characterized by establishing the information means for reporting that actuation of said detecting element is normal or unusual by making into abnormalities the case where it deviates from said normal range.

[Function]

The information which the apnoea measuring device of this invention detected breathing as mentioned above, memorizes the information about breathing or an apnoea in the memory section, and was memorized It is what performs required data processing by transmitting to the computer for data processing of another object installed in the hospital etc. through direct or the telephone line. On the occasion of measurement, equipments, such as a computer for data processing, and a monitor, a printer, are not needed, but the apnoea condition under sleep can be measured only with the equipment of this invention. For this reason, a measuring device can be miniaturized extremely, a patient can bring home and it can measure easily. Moreover, although it worries about the measurement mistake produced since unfamiliar compared with the former in order that a patient

attaches [ connection or ] a detecting element, without borrowing a medical practitioner's hand and may perform measurement actuation on the occasion of measurement, [ begin ] detection of breathing to the equipment of this invention -- normal -- or In measurement, since an information means to tell an unusual thing is established, when unusual, connection and the installation part of a detecting element can be checked, after checking that detection of breathing is performed normally, measurement can be started, and a measurement mistake can be prevented.

#### [Example]

A drawing is used for below and one example of this invention is explained to it. A 1st [ \*\* ] Fig. R> Fig. is a block diagram, 1 is a detecting element and the thermistor 2 and the electrode 3 for electrocardiograms are formed. As shown in Fig. 2, a thermistor 2 is attached in the bottom of a test subject's 4 nose, detects the temperature change by tidal air, and the electrode 3 for electrocardiograms is attached in a test subject's 4 thorax, and it detects a heartbeat. Although it is not necessarily required, if breathing stops, since a heartbeat becomes late, it can refer to the electrode 3 for electrocardiograms as information when checking respiratory arrest. 5 changes the analog signal from a thermistor 2 and the electrode 3 for electrocardiograms into a digital signal in the signal-processing section, respectively, and memorizes the information about respiratory stopping time, a respiratory stop time, etc. in the memory section 6 with the start time of the exhalation for identifying each breathing about the signal from a thermistor 2. It considers as the time amount in which the time of day when the signal stopped, respectively and a signal when it is the so-called apnoea in which the respiratory signal from a thermistor 2 stopped 10 seconds or more about respiratory stopping time and a respiratory stop time have stopped.

About the signal from the electrode 3 for electrocardiograms, if 1 time of a heartbeat converts into per for 1 minute, for example, it will convert the heart rate of how many times it becomes, and the value will be memorized in the memory section 6. Storage of the information on these memory section 6 is memorized as information with time, and storage is held for at least 24 hours or more. 7 is an information means and it consists of the discernment processing section 8 for identifying whether detection of breathing is performed normally, and the information equipment 9 for telling that detection of breathing is normal or the above with the judgment of this discernment processing section 8. Although it is judged as what has abnormalities in detection of breathing by a certain cause in the discernment processing section 8 when the respiration rate per for 1 minute was detected by within the limits which is 10 - 30 times, and detection of breathing shall be performed normally and it deviates from 10 - 30 times Since this does not detect breathing at all or usually serves as an unusually high respiration rate when there are poor attachment of a detecting element 1 and a poor contact of a signal line, the comparatively large normal range of said respiration rate can be taken. Information equipment 9 emits an alarm by blinking a buzzer or a lamp etc., when it accepts as abnormalities according to decision of the discernment processing section 8. Or only when it accepts as normal, you may make it blink a buzzer or a lamp again. In case a patient starts measurement, this information means 7 can direct actuation of the information means 7, and can check the existence of the abnormalities of respiratory detection at any time.

10 is the apnoea measuring device which consists of said detecting element 1, the signal-processing section 5, the memory section 6, and an information means 7, and the patient after checking that detection of breathing is normally performed by the information means 7 as mentioned above can sleep, can measure the respiratory condition under sleep, and can memorize the information.

It is a computer for data processing, 11 is installed in the hospital etc., and by inputting the information memorized to said apnoea measuring device 10 through direct or the telephone line by the cable, information is processed, and by the monitor 12 or the printer 13, it has become as data can be displayed or recorded by the graph or the numeric value.

#### [Effect of the Invention]

according to this invention explained above -- an apnoea measuring device -- for example, the start time of breathing -- or since the information about the respiratory stopping time and respiratory stop time, and heart rate of an apnoea can be made to be able to measure and memorize and such concrete information can be acquired through the computer for data processing, the apnoea condition under sleep can be grasped objective and it can diagnose easily whether it is sleep apnea syndrome. Moreover, in measuring, since it can check easily whether breathing is normally detected by the

information means, even if the patient itself faces [ measuring an apnoea at a house at the time of sleep, and ], there will be few measurement mistakes and they can perform right measurement.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention]

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]

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**MEANS**

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**[Means for Solving the Problem]**

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OPERATION

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[Function]

The information which the apnoea measuring device of this invention detected breathing as mentioned above, memorizes the information about breathing or an apnoea in the memory section, and was memorized. It is what performs required data processing by transmitting to the computer for data processing of another object installed in the hospital etc. through direct or the telephone line. On the occasion of measurement, equipments, such as a computer for data processing, and a monitor, a printer, are not needed, but the apnoea condition under sleep can be measured only with the equipment of this invention. For this reason, a measuring device can be miniaturized extremely, a patient can bring home and it can measure easily. Moreover, although it worries about the measurement mistake produced since unfamiliar compared with the former in order that a patient attaches [ connection or ] a detecting element, without borrowing a medical practitioner's hand and may perform measurement actuation on the occasion of measurement, [ begin ] detection of breathing to the equipment of this invention -- normal -- or In measurement, since an information means to tell an unusual thing is established, when unusual, connection and the installation part of a detecting element can be checked, after checking that detection of breathing is performed normally, measurement can be started, and a measurement mistake can be prevented.

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